

### **REMARKS**

Claim 28 has been amended. Claims 28-48 are pending in the application. In view of the remarks that follow, Applicants respectfully request reconsideration.

#### **Allowable Subject Matter**

Noted with appreciation is the indication in the Office Action that Claims 33-41 have been allowed.

#### **Comment on Statement of Reason for Allowance**

In the paragraph that bridges pages 5-6, the Office Action gives a reason for the allowance of Claims 33-41. Applicants agree that Claims 33-41 recite allowable subject matter. However, Applicants do not agree in all respects with the stated reason. For example, Applicants do not agree with the stated reason to the extent that it mentions limitations that are not actually present in all of the allowed claims. In addition, Applicants believe that the stated reason should not be interpreted to mean that it is the only reason supporting the allowability of these claims, and that there are no other reasons that separately and independently support the allowability of the independent claims and/or the dependent claims.

#### **Preliminary Comment Regarding Chu U.S. Patent No. 6,350,993**

With reference to Figure 1 of Chu, the Office Action asserts that Chu's Si layer 15 is a "strained-Si epi layer". However, layer 15 in Chu is not Si or strained, but instead is a relaxed SiGe layer (line 20 of column 7). On the other hand, Chu's layer 14 is a strained Si epi layer (line 11 of column 7). It thus appears that the Office Action includes a typographical error, and that the Examiner intended to refer to Chu's layer 14 rather than Chu's layer 15. The discussion below assumes that the Office Action intended to refer to Chu's layer 14 rather than Chu's layer 15.

Independent Claim 28

Independent Claim 28 stands rejected under 35 U.S.C. §103 as obvious in view of a proposed combination of teachings from Chu U.S. Patent No. 6,350,993 and Lochtefeld U.S. Patent Application Publication No. 2006/0197126. This rejection is respectfully traversed. The PTO specifies in MPEP §2142 that:

The examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. If the examiner does not produce a *prima facie* case, the applicant is under no obligation to submit evidence of nonobviousness.

Applicants respectfully submit that Chu and Lochtefeld fail to establish a *prima facie* case of obviousness under §103 with respect to Claim 28, for reasons discussed below.

CHU AND LOCHTEFELD FAIL TO TEACH ALL OF THE CLAIM LIMITATIONS

The provisions of MPEP §2142 specify with respect to §103 that:

To establish a *prima facie* case of obviousness . . . the prior art reference (or references when combined) must teach or suggest **all** the claim limitations. (Emphasis added).

The PTO considers this requirement to be important, as evidenced by the fact that this exact language appears not only in MPEP §2142, but also in other sections of the MPEP, including MPEP §706.02(j) and MPEP §2143. Applicants' Claim 28 includes a recitation of:

. . . a strained substrate . . . comprising an uppermost strained-Si epi layer, a middle relaxed Si<sub>1-x</sub>Ge<sub>x</sub> layer and a

lowermost graded  $\text{Si}_{1-y}\text{Ge}_y$  layer, the uppermost strained-Si  
epi layer being disposed directly on the middle relaxed  
 $\text{Si}_{1-x}\text{Ge}_x$  layer; . . . .

The Office Action asserts that Chu's layers 14 and 12C respectively correspond to the "uppermost strained-Si epi layer" and the "middle relaxed  $\text{Si}_{1-x}\text{Ge}_x$  layer" that are recited in Claim 28. However, Claim 28 also calls for "the uppermost strained-Si epi layer being disposed directly on the middle relaxed  $\text{Si}_{1-x}\text{Ge}_x$  layer". In contrast, in Figure 1 of Chu, the layer 14 is not disposed directly on the layer 12C. Lochtefeld is relied on only for a teaching of a high-k gate dielectric, and thus does not cure this defect in the disclosure of Chu. Consequently, Chu and Lochtefeld fail to satisfy the requirement of MPEP §2142 that their combined teachings must "teach or suggest **all** the claim limitations" (emphasis added). It is thus respectfully submitted that the Office Action fails to establish a prima facie case of obviousness with respect to Claim 28. Accordingly, for this independent reason alone, it is respectfully submitted that Claim 28 is not rendered obvious under §103 by Chu and Lochtefeld, and notice to that effect is respectfully requested.

#### Independent Claim 31

Independent Claim 31 stands rejected under 35 U.S.C. §103 as obvious in view of a proposed combination of teachings from Chu and Lochtefeld. This rejection is respectfully traversed. As noted above, the PTO specifies in MPEP §2142 that:

The examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. If the examiner does not produce a *prima facie* case, the applicant is under no obligation to submit evidence of nonobviousness.

Applicants respectfully submit that Chu and Lochtefeld fail to establish a *prima facie* case of obviousness under §103 with respect to Claim 31, for reasons discussed below.

#### CHU AND LOCHTEFELD FAIL TO TEACH ALL OF THE CLAIM LIMITATIONS

As noted earlier, the provisions of MPEP §2142 specify with respect to §103 that:

To establish a *prima facie* case of obviousness . . . the prior art reference (or references when combined) must teach or suggest **all** the claim limitations. (Emphasis added).

Applicants' Claim 31 includes a recitation of:

. . . a structure having a strained substrate formed thereover, the strained substrate comprising an uppermost strained-Si epi layer, a middle Si<sub>1-x</sub>Ge<sub>x</sub> layer and a lower silicon oxide layer; . . . .

The Office Action fails to clearly identify what structure in Figure 1 of Chu supposedly corresponds to the "lower silicon oxide layer" in Claim 31. Figure 1 of Chu does not appear to disclose any layer that is made of silicon oxide, much less a silicon oxide layer having the claimed positional relationship with respect to certain other layers. Lochtefeld is relied on only for a teaching of a high-k gate dielectric, and thus does not cure this defect in the disclosure of Chu. Consequently, Chu and Lochtefeld fail to satisfy the requirement of MPEP §2142 that their combined teachings must "teach or suggest **all** the claim limitations" (emphasis added). It is thus respectfully submitted that the Office Action fails to establish a *prima facie* case of obviousness with respect to Claim 31. Accordingly, for this independent

reason alone, it is respectfully submitted that Claim 31 is not rendered obvious under §103 by Chu and Lochtefeld, and notice to that effect is respectfully requested.

Independent Claim 46

Independent Claim 46 stands rejected under 35 U.S.C. §103 as obvious in view of a proposed combination of teachings from Chu and Lochtefeld. This rejection is respectfully traversed. As noted above, the PTO specifies in MPEP §2142 that:

The examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. If the examiner does not produce a *prima facie* case, the applicant is under no obligation to submit evidence of nonobviousness.

Applicants respectfully submit that Chu and Lochtefeld fail to establish a *prima facie* case of obviousness under §103 with respect to Claim 46, for reasons discussed below.

CHU AND LOCHTEFELD FAIL TO TEACH ALL OF THE CLAIM LIMITATIONS

As noted earlier, the provisions of MPEP §2142 specify with respect to §103 that:

To establish a *prima facie* case of obviousness . . . the prior art reference (or references when combined) must teach or suggest **all** the claim limitations. (Emphasis added).

Applicants' Claim 46 includes a recitation of:

. . . a structure having a strained substrate formed thereover, the  
strained substrate comprising only an uppermost strained-Si epi  
layer . . . .

The Office Action asserts that Figure 1 shows "a strained substrate 11-18", where the layers 11-18 include a variety of different materials. In contrast, Claim 46 calls for a strained substrate that contains "only" a strained Si epi layer. The Office Action does not identify any embodiment of Chu in which a strained substrate includes only a strained Si epi layer. Lochtefeld is relied on only for a teaching of a high-k gate dielectric, and thus does not cure this defect in the disclosure of Chu. Consequently, Chu and Lochtefeld fail to satisfy the requirement of MPEP §2142 that their combined teachings must "teach or suggest all the claim limitations" (emphasis added). It is thus respectfully submitted that the Office Action fails to establish a prima facie case of obviousness with respect to Claim 46. Accordingly, for this independent reason alone, it is respectfully submitted that Claim 46 is not rendered obvious under §103 by Chu and Lochtefeld, and notice to that effect is respectfully requested.

#### Independent Claim 42

Independent Claim 42 stands rejected under 35 U.S.C. §103 as obvious in view of a proposed combination of teachings from Chu, Lochtefeld, and Dwilinski U.S. Patent Application Publication No. 2006/0057749. This rejection is respectfully traversed. As noted above, the PTO specifies in MPEP §2142 that:

The examiner bears the initial burden of factually supporting any  
*prima facie* conclusion of obviousness. If the examiner does not

produce a *prima facie* case, the applicant is under no obligation to submit evidence of nonobviousness.

Applicants respectfully submit that Chu, Lochtefeld and Dwilinski fail to establish a *prima facie* case of obviousness under §103 with respect to Claim 42, for reasons discussed below.

#### CHU, LOCHTEFELD AND DWILINSKI FAIL TO TEACH ALL CLAIM LIMITATIONS

As noted earlier, the provisions of MPEP §2142 specify with respect to §103 that:

To establish a *prima facie* case of obviousness . . . the prior art reference (or references when combined) must teach or suggest all the claim limitations. (Emphasis added).

Applicants' Claim 42 includes a recitation of:

. . . an uppermost strained-Si epi layer having a dislocation density of strained-Si epi of less than about  $1\text{E}6/\text{cm}^2$ ; . . .

At the bottom of page 4, the Office Action admits that Chu and Lochtefeld fail to disclose a dislocation density for strained Si epi that is less than about  $1\text{E}6/\text{cm}^2$ . The Office Action then asserts that paragraph [0002] of Dwilinski discloses a dislocation density for strained Si epi that is less than about  $1\text{E}6/\text{cm}^2$ . This assertion is respectfully traversed. Paragraph [0002] of Dwilinski does mention a dislocation density of  $1\text{E}6/\text{cm}^2$ . However, paragraph [0002] merely makes a general reference to epitaxy layers that have this dislocation density, without ever specifically indicating that the material having this dislocation density is Si, much less strained Si.

In effect, the Examiner assumes that if a dislocation density of  $1\text{E}6/\text{cm}^2$  can itself be shown to be obvious, then the entire combination recited in Claim 42 must also necessarily be obvious. But this approach is expressly prohibited by MPEP §2141.02, which emphasizes that:

THE CLAIMED INVENTION MUST BE CONSIDERED  
AS A WHOLE

In determining the differences between the prior art and the claims, the question under 35 U.S.C. §103 is not whether the differences themselves would have been obvious, but whether the claimed invention as a whole would have been obvious. (Emphasis in original).

Applicants respectfully submit that the approach taken in the Office Action runs afoul of this MPEP requirement.

For the foregoing reasons, it is respectfully submitted that Chu, Lochtefeld and Dwilinski fail to satisfy the requirement of MPEP §2142 that their combined teachings must "teach or suggest all the claim limitations" (emphasis added). It is thus respectfully submitted that the Office Action fails to establish a prima facie case of obviousness with respect to Claim 42. Accordingly, for this independent reason alone, it is respectfully submitted that Claim 42 is not rendered obvious under §103 by Chu, Lochtefeld and Dwilinski, and notice to that effect is respectfully requested.

Dependent Claims

Claims 29-30, Claim 32, Claims 43-45 and Claims 47-48 respectively depend from Claim 28, Claim 31, Claim 42 and Claim 46, and are also believed to be distinct from the art of record, for example for the same reasons discussed above with respect to Claims 28, 31, 42 and 46, respectively.

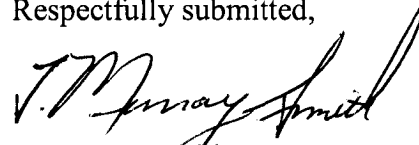


Conclusion

Based on the foregoing, it is respectfully submitted that all of the pending claims are fully allowable, and favorable reconsideration of this application is therefore respectfully requested. If the Examiner believes that examination of the present application may be advanced in any way by a telephone conference, the Examiner is invited to telephone the undersigned attorney at 972-739-8647.

Although Applicants believe that no fee is due in association with the filing of this Response, the Commissioner is hereby authorized to charge any additional fee required by this paper, or to credit any overpayment, to Deposit Account No. 08-1394 of Haynes and Boone LLP.

Respectfully submitted,



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Enclosure: None

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